PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	ON See Notifi	ication of Transmittal of International
15-535 PCT	POR PORTIER ACTI	Preliminary	Examination Report (Form PCT/IPEA/416)
International application No.	International filing date	(day/month/year)	Priority date (day/month/year)
PCT/US00/06848	15 MARCH 2000		NONE
International Patent Classification (IPC) IPC(7): B01D 61/10 and US Cl.: 210	· _	and IPC	
Applicant KINETICO INCORPORATED			
This international prelimin Examining Authority and is This REPORT consists of a	s transmitted to the appli	has been prepar	red by this International Preliminary Article 36.
This report is also accombeen amended and are the	panied by ANNEXES, i.e	or sheets containia	cription, claims and/or drawings which have ng rectifications made before this Authority. nder the PCT).
These annexes consist of a to	tal of sheets.		
3. This report contains indication	ns relating to the followi	ing items:	
I X Basis of the repo	ort		
II Priority			
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IV Lack of unity of			
	nt under Article 35(2) with anations supporting such s		v, inventive step or industrial applicability;
VI Certain documents	cited		
VII Certain defects in	the international applicati	on	,
VIII Certain observation	ns on the international ap	plication	
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Date of submission of the demand		Date of completio	n of this report
15 OCTOBER 2001		01 MAY 2002	
Name and mailing address of the IPEA	l l	Authorized officer	New 1 1 n Jones
Commissioner of Patents and Trader Box PCT Washington, D.C. 20231	narks	JOSEPH DRO	DOGE Muf (Me)
Facsimile No. (703) 305-3230	-	Telephone No.	(703)-308-0661

International	applic	cation	No.

PCT/US00/06848

I. Ba	isis of the re	eport 				
1 With	regard to the	elements of the interna	ational annication:*			
1. W.M.	_	ional application as				
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	furnished su	bsequently to this	Authority in writ	ten form.		
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International application No.

PCT/US00/06848

V.	Reasoned statement under Article 35(2) with regard to novelty, inventive step	r industrial applicability;
	citations and explanations supporting such statement	

1.	statement			
	Novelty (N)	Claims	1-13	YES
		Claims	NONE	NO
	Inventive Step (IS)	Claims	1-13	YES
		Claims	NONE	NO NO
	Industrial Applicability (IA)	Claims	1-13	YES
		Claims	NONE	NO

2. citations and explanations (Rule 70.7)

Claims 1 and 10 meet the criteria set out in PCT Article \$5(2)-(3), because the prior art does not teach or fairly suggest in a system that includes a tank assembly having an outer tank wall and pressurizing region between an expandable bladdr in the tank and the tank wall with a control valve device operative to effect communication of source water to the pressurizing region when dispensing and draining of such water when not dispensing, with the further characterization of the valve device having two positions which are responsive to fluid pressure at a dispensing device and also a servo valve which is responsive to the pilot valve, as recited in claims 1 and 10, respectively. BURROWS and also CLARK patent 4,997,583 are deemed to be representative of the closest prior art in that they teach such tank assembly containing bladder and pressurizing region communicating with a control valve device, however not suggesting a pilot valve and servo valve as claimed.

Claim 2 meets the criteria set forth in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a storage device for storing treated water discharged by a water treatment unit and including a tank assembly with water tank housing and expandable bladder, defining a pressurizing region together therebetween, and also having a valve member controlling communication of source water under pressure to the pressurizing region and communication of the pressurizing region with drain, in which the source of water is water that is obtained upstream of the water treatment tank. The closest prior art is deemed to be BURROWS generally decribing such water treatment unit, storage device, tank assembly and bladder, however the valve member in BURROWS teaches supplying of concentrate source water from downstream of the water treatment unit.

Claims 12 and 15 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a tank assembly containing an outer tank housing, an expandable bladder within the tank and a pressurizing region therebetween and also containing a control valve, such control valve having the specific features of a depending threaded segment extending (Continued on Supplemental Sheet.)

International application No.

PCT/US00/06848

Supplemental B	nx
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(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

This report has been drawn on the basis of the description, page(s) 2-16, as originally filed.

page(s) 1, filed with the demand.

and additional amendments:

This report has been drawn on the basis of the claims, page(s) NONE, as originally filed.

page(s) NONE, as amended under Article 19.

page(s) NONE, filed with the demand.

and additional amendments:

Pages 18-21, filed with the letter of 11 March 2002

This report has been drawn on the basis of the drawings, page(s) NONE, as originally filed.
page(s) 1-7, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the sequence listing part of the description: page(s) NONE, as originally filed.
pages(s) NONE, filed with the demand.
and additional amendments:
NONE

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

into the interior of the tank housing and also a threaded retaining element threadedly received by the control valve segment and operative to capture a neck portion of the bladder between itself and an engagement surface of the lower segment.

Claims 1-13 have industrial applicability as defined by PCT Article 33(4). Claims 1-13 define apparatus having utility in the home and industrial water purification industry.

	NEW	CITATIONS	
NONE			

15-535

FLUID TREATMENT SYSTEM

Technical Field

The present invention relates generally to fluid treatment systems and, in particular, to a storage tank and storage tank control valve for use with a fluid treatment system, such as a reverse osmosis system.

Background Art

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It is known to use a storage tank to store a processed fluid produced by a fluid treatment system. For example, reverse osmosis systems are used to produce potable or drinking water from water sources that contain undesirable contaminants, etc. In a typical reverse osmosis system, especially in the type of reverse osmosis system used in homes, the rate at which treated water or "permeate" is produced by the system can be very low. a result, a storage tank is used to store permeate, so that relatively large quantities can be made available when the consumer opens the tap or faucet. "precharged" storage tanks are used. In this type of storage tank, a bladder is used to define a pressurized chamber, usually filled with a compressible gas, such as The bladder isolates the gas from the processed water received by the tank. As processed water or "permeate" (in the case of a reverse osmosis system) is received by the tank, it gradually compresses the gas in the pressurized chamber. As a result, the permeate is stored under pressure, such that when the faucet is opened, the pressure in the storage tank exerted by the compressed gas, forces permeate out of the tank and to the faucet.

AMENDED SHEET

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communicated with a source pressure, whereby contracting forces are applied to said bladder in order to drive permeate from said bladder of said tank and to said dispensing device.

- 2. A storage device for storing treated water discharged by a water treatment unit, comprising:
- a) a tank assembly including an outer tank housing enclosing within it, an expandable bladder;
- b) a pressurizing region defined between an outside of said bladder and an inside of said outer tank housing;
- c) a valve member for controlling the communication of a source water under pressure with said pressurizing region and for controlling the communication of said pressurizing region with a drain, said source of water being water obtained upstream of said water treatment unit;
- d) a fluid pressure operated control device responsive to a dispensing device for said treated water, said control device operative to connect said source water to said pressurizing region when said dispensing device is dispensing treated water and operative to communicate said pressurizing region with said drain when said dispensing device is not dispensing water.
- 3. The apparatus of claim 2, wherein said control device includes a pilot valve responsive to a fluid pressure at said dispensing device and movable between at least two positions and a servo valve responsive to the position of said pilot valve.
- 4. The apparatus of claim 3, wherein said pilot valve includes a source water port, a common port, and a drain port.
 - 5. The apparatus of claim 4, wherein said pilot

valve further includes a piston operated land for controlling the communication between said common port and said source port and between said common port and said drain port.

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- 6. The apparatus of claim 5, further comprising a servo valve having a source water port, a common port and a drain port.
- 7. The apparatus of claim 6, wherein said servo valve further includes a piston operated spool valve for controlling the communication of said common port with said source water port and said drain port, said common port and drain port being sized to permit relatively unrestricted flow of source water out of said pressurizing region of said tank assembly when said servo valve common port and servo valve drain port are cross communicated by said spool valve.
- 8. The apparatus of claim 7, wherein said water treatment unit comprises a reverse osmosis module having a permeate output, a source water input and a concentrate output.
- 9. The apparatus of claim 8, further including a post filter disposed between a supply conduit communicating with said tank assembly and said dispensing device whereby treated water dispensed from said tank assembly tank is conveyed through said post filter before being dispensed.
- 10. A storage system for a reverse osmosis system, comprising:
- a) a storage tank having a tank housing enclosing an elastomeric, expandable bladder;
- b) said tank housing and bladder defining therebetween a pressurizing region for receiving fluid

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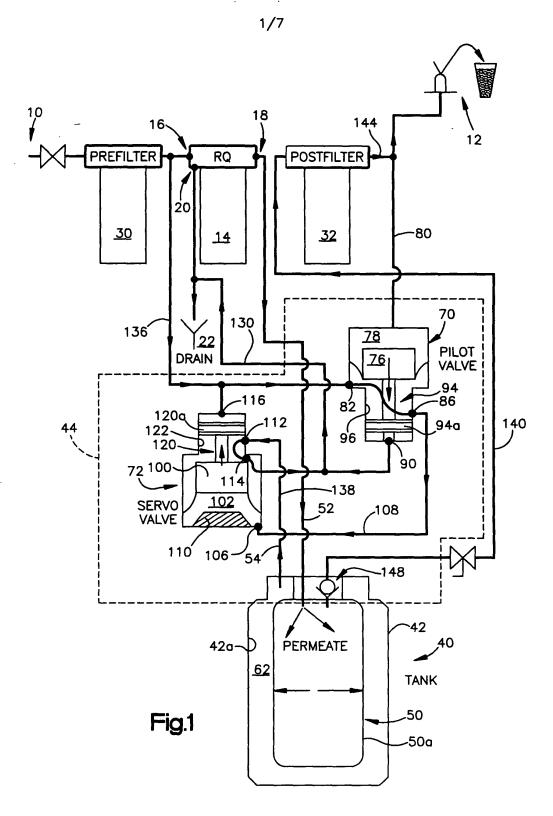
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under pressure for exerting contracting forces on said bladder to expel permeate contained in said bladder;

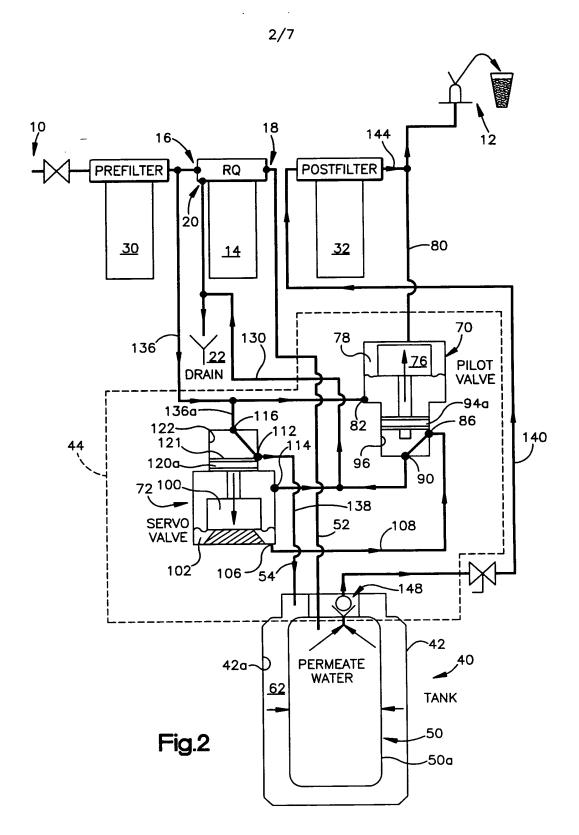
- c) a pilot valve responsive to the state of a dispensing device such that said pilot valve moves to a first position when permeate is being dispensed by said dispensing device and moves to a second position when said dispensing device is not dispensing permeate; and,
- d) a servo valve responsive to said pilot valve and operative to communicate source water under pressure to said pressurizing region of said storage tank when said pilot valve is in its first position and operative to communicate said pressurizing region with a drain when said pilot valve is in its second position.
- 11. The apparatus of claim 10, wherein said pilot valve is responsive to pressure in a permeate supply line feeding said dispensing device.
- 12. A storage assembly for storing treated water discharged by a water treatment unit, comprising:
- a) a tank assembly including an outer tank housing and enclosing within it an expandable bladder;
- b) structure defining a pressurizing region defined between an outside of said bladder and an inside of said outer housing;
- c) a control valve mounted to said outer tank housing;
- d) said control valve including a depending, threaded segment extending into an interior of said tank housing; and,
- e) a threaded retaining element threadedly receivable by said control valve segment and operative to capture a neck portion of said bladder between itself and an engagement surface defined by said lower segment.

13. The apparatus of claim 12, further including a retainer bearing disposed between said retainer and said bladder neck which facilitates relative rotation between said bladder and said retainer.

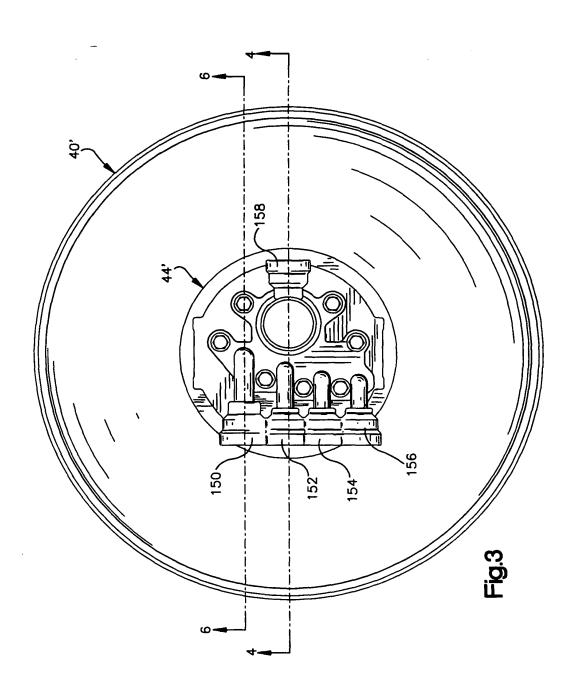
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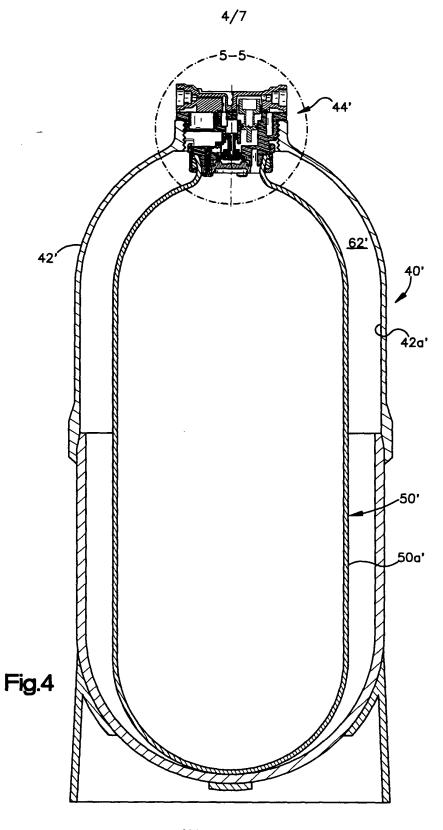
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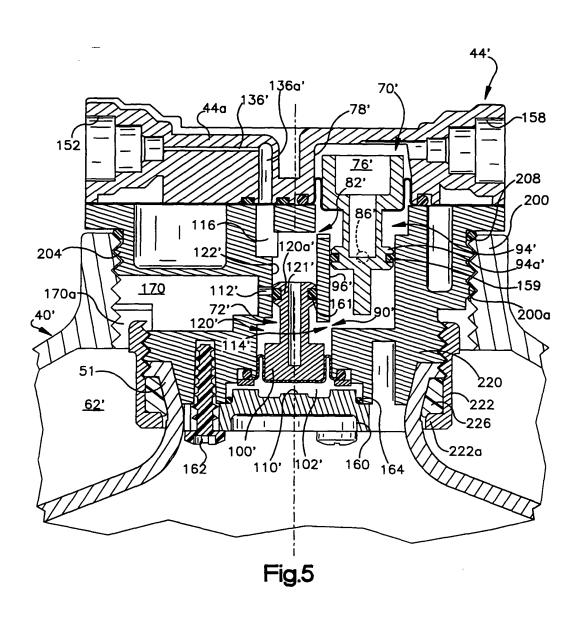
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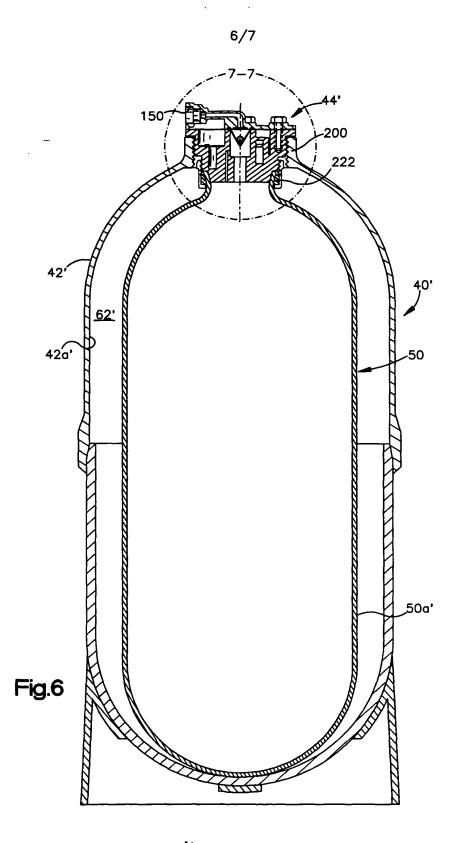


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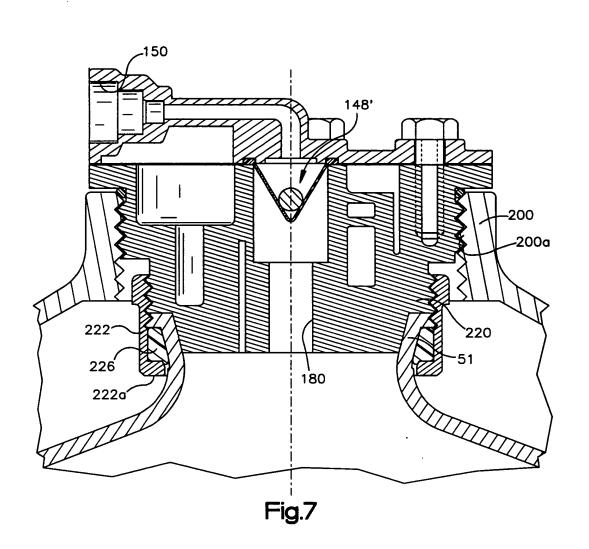


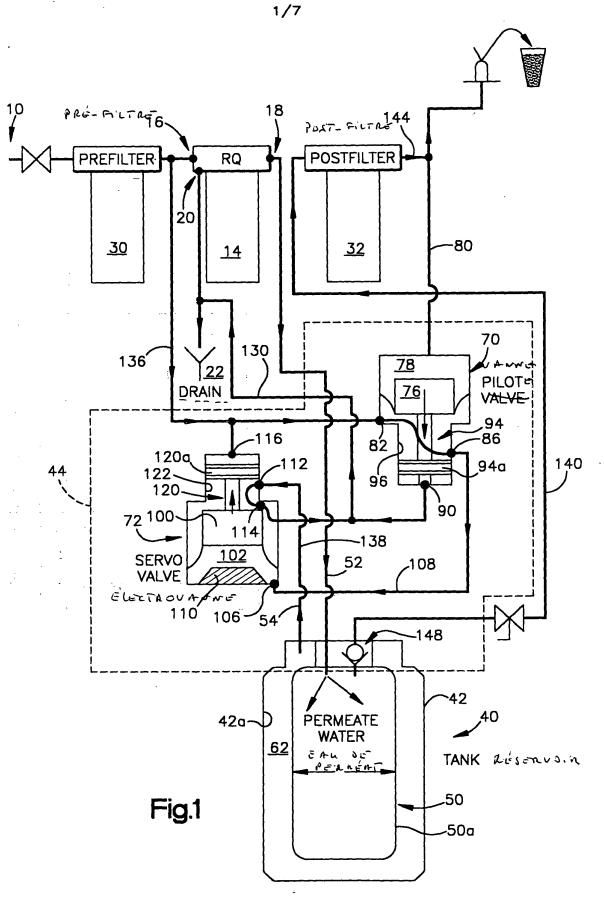
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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference	FOR FURTHER AC	CTION See Notif	fication of Transmit y Examination Report (1	tal of International
International application No.	International filing da		Priority date (day/n	
PCT/US00/06848	15 MARCH 2000	,	NONE (MA)	and Same
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Applicant KINETICO INCORPORATED				· · · · · · · · · · · · · · · · · · ·
1. This international prelimi Examining Authority and	nary examination repo is transmitted to the ap	ort has been prepa	red by this Internator Article 36.	ional Preliminary
2. This REPORT consists of	a total of sheets.			
been amended and are t	mpanied by ANNEXES, the basis for this report a tion 607 of the Administ	nd/or sheets containi	ng rectifications made	drawings which have before this Authority.
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II Priority				1
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V X Reasoned stateme citations and expl	ent under Article 35(2) w lanations supporting such	vith regard to novelty a statement	, inventive step or ind	ustrial applicability,
VI Certain documents	s cited	-	ļ ,- <u>'</u> ,	contained in the lists
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Commissioner of Patents and Trade Box PCT	marks	JOSEPH DRO	DOE / Mily	PACEL
Washington, D.C. 20231				
Facsimile No. (703) 305-3230		Telephone No. (7.03)-308-0661	1. 19 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.

Form PCT/IPEA/409 (cover sheet) (July 1998)★

International application No.

PCT/US00/06848

Basis of the	report	· .
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This report beyond the	drawings, sheets/ fig NONE has been drawn as if (some of) the amendments had not been made, since they e disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).** ets which have been furnished to the receiving Office in response to an invitation unc	der Anticle 14 are - referred t
This report beyond the Replacement sheein this report as and 70.17).	drawings, sheets/ fig NONE has been drawn as if (some of) the amendments had not been made, since they e disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**	ler Anicle 14 are referred t n amendments (Rules 70.16

International application No.

PCT/US00/06848

	Reasoned statement under Articl			tep or industrial	applicability;
c	citations and explanations suppo	orting such statement	<u> </u>	· · · · · · · · · · · · · · · · · · ·	

1. statement

Novelty (N)	Claims	1-13	YES
	Claims	NONE	NO
Inventive Step (IS)	Claims	1-13	YES
	Claims	NONE -	NO NO
Industrial Applicability (IA)	Claims	1-13	YES
	Claims	NONE	NO NO

2. citations and explanations (Rule 70.7)

Claims 1 and 10 meet the criteria set out in PCT Article \$3(2)-(3), because the prior art does not teach or fairly suggest in a system that includes a tank assembly having an outer tank wall and pressurizing region between an expandable bladdr in the tank and the tank wall with a control valve device operative to effect communication of source water to the pressurizing region when dispensing and draining of such water when not dispensing, with the further characterization of the valve device having two positions which are responsive to fluid pressure at a dispensing device and also a servo valve which is responsive to the pilot valve, as recited in claims 1 and 10, respectively. BURROWS and also CLARK patent 4,997,588 are deemed to be representative of the closest prior art in that they teach such tank assembly containing bladder and pressurizing region communicating with a control valve device, however not suggesting a pilot valve and servo valve as claimed.

Claim 2 meets the criteria set forth in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a storage device for storing treated water discharged by a water treatment unit and including a tank assembly with water tank housing and expandable bladder, defining a pressurizing region together therebetween, and also having a valve member controlling communication of source water under pressure to the pressurizing region and communication of the pressurizing region with drain, in which the source of water is water that is obtained upstream of the water treatment tank. The closest prior art is deemed to be BURROWS generally decribing such water treatment unit, storage device, tank assembly and bladder, however the valve member in BURROWS teaches supplying of concentrate source water from downstneam of the water treatment unit.

Claims 12 and 13 meet the criteria set out in PCT Article 33(2)-(8), because the prior art does not teach or fairly suggest a tank assembly containing an outer tank housing, an expandable bladder within the tank and a pressurizing region therebetween and also containing a control valve, such control valve having the specific features of a depending threaded segment extending (Continued on Supplemental Sheet.)

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International application No.

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(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

This report has been drawn on the basis of the description, page(s) 2-16, as originally filed. page(s) 1, filed with the demand. and additional amendments:

NONE

This report has been drawn on the basis of the claims, page(s) NONE, as originally filed.
page(s) NONE, as amended under Article 19.
page(s) NONE, filed with the demand.
and additional amendments:
Pages 18-21, filed with the letter of 11 March 2002

This report has been drawn on the basis of the drawings, page(s) NONE, as originally filed.
page(s) 1-7, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the sequence listing part of the description: page(s) NONE, as originally filed.
pages(s) NONE, filed with the demand.
and additional amendments:
NONE

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

into the interior of the tank housing and also a threaded retaining element threadedly received by the control valve segment and operative to capture a neck portion of the bladder between itself and an engagement surface of the lower segment.

Claims 1-13 have industrial applicability as defined by PCT Article 33(4). Claims 1-13 define apparatus having utility in the home and industrial water purification industry.

-----NEW CITATIONS ------NONE

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PATENT COOPERATION TREATY

From the INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To: JOHN R. HLAVKA
WATTS, HOFFMANN, FISHER & HEINKE CO.,
L.P.A.
P.O. BOX 99839
CLEVELAND OH 44199-0839

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing (day/month/year)

22 MAY 2002

Applicant's or agent's file reference

15-535 PCT

IMPORTANT NOTIFICATION

International application No.

PCT/US00/06848

International filing date (day/month/year)

Priority Date (day/month/year)

15 MARCH 2000

NONE

Applicant

KINETICO INCORPORATED

- 1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international
- 2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
- 3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US

Commissioner of Patents and Trademarks

Box PCT Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

JOSEPH DRODGE

Telephone No. (703)-308-0661

Form PCT/IPEA/416 (July 1992)★

INTERNATIONAL SEARCH REPORT

International application No. PCT/US00/06848

A. CLASSIFICATION OF SUBJECT MATTER						
A. CLASSIFICATION OF SUBJECT MATTER IPC(7) :B01D 61/10						
US CL	:210/109					
According	According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIEI	LDS SEARCHED					
Minimum d	locumentation searched (classification system follows	ed by classification symbols)				
U.S. :	210/109, 110, 116, 134, 195.2, 257.2, 259, 321.65	5				
Documenta	tion searched other than minimum documentation to th	e extent that such documents are included	in the fields searched			
Electronic o	data base consulted during the international search (r	name of data hase and where practicable	e search terms used)			
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C. DOC	CUMENTS CONSIDERED TO BE RELEVANT					
Category*	Citation of document, with indication, where a	ppropriate, of the relevant passages	Relevant to claim No.			
Y	US 5,662,793 A (BEALL JR) 02 document	September 1997, see entire	1-11			
Y	US 4,997,553 A (CLACK) 05 March 1991, see entire document		1-12			
Y	US 4,776,952 A (BURROWS) 11 October 1988, see entire document 7-9, 12					
Y	US 4,705,625 A (HART JR) 10 November 1987, see entire 9 document					
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Further documents are listed in the continuation of Box C. See patent family annex.						
* Spe	ecial categories of cited documents:	"T" later document published after the inter	mational filing date or priority			
"A" doc	rument defining the general state of the art which is not considered be of particular relevance	date and not in conflict with the appli the principle or theory underlying the	cation but cited to understand invention			
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PATENT COOPERATION TREATY

	From the INTERNATIONAL BUREAU	
PCT	То:	
NOTIFICATION OF ELECTION (PCT Rule 61.2)	Commissioner US Department of Commerce United States Patent and Trademark Office, PCT 2011 South Clark Place Room CP2/5C24 Arlington, VA 22202	
Date of mailing (day/month/year)	ETATS-UNIS D'AMERIQUE	
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International application No. PCT/US00/06848	Applicant's or agent's file reference 15-535 PCT	
International filing date (day/month/year) 15 March 2000 (15.03.00)	Priority date (day/month/year)	
Applicant HALEMBA, Peter et al		
1. The designated Office is hereby notified of its election made: X in the demand filed with the International Preliminary Examining Authority on: 15 October 2001 (15.10.01)		

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland

Authorized officer

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